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Institute for Watershed Studies Research Assistant

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COLLEGE OF THE ENVIRONMENT



Internship Title: Water Quality Research Assistant at the Institute for Watershed Studies

Student Name: Julia Ralston

Internship Dates: June 21, 2023 to August 24, 2023

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STUDENT SIGNATURE

Julia Ralston

DATE:

8/8/2023

I did my internship at the Institute for Watershed Studies (IWS). The Institute is connected to Western Washington University's College of the Environment. The IWS conducts water quality research on bodies of freshwater and for some of their projects they collaborate with local government, and other organizations on water quality issues. I first learned about IWS from a job listing for their summer research assistant position, which entailed doing in the field sampling of around 60 small lakes in the area, and also doing some lab work with those water samples. At the time I was taking a Watershed Biogeochemistry class at WWU, and my class was able to take a tour of the IWS labs and learn a little bit about what they do there. I was interested in their work, and I was familiar with water quality techniques, so the summer job sounded like a great opportunity to me.

Going into this internship I had a couple of learning objectives, and I feel I was able to complete all of them successfully. First, I was expecting to learn the specific techniques for lake sampling and how to collect those samples without compromising them. This was a goal that I feel was completed. I was taught a method of sampling that works well for small lakes, like the ones that we sampled from. For most lakes we used waders and waded into the lake. We brought with us a very long pole with a bottle at the end of it. This is what was used to collect the water samples. The reason for this was so you could reach far away from where you had disrupted the water from wading in. At some of the lakes, there were docks present, so we used the long pole and sampled from the dock instead. Another technique that I learned out in the field was one way of collecting algae samples. We used a net with a long rope, and threw the net multiple times out away from us, and then would drag the net back through the upper layers of the water. It is also best to throw the net into different habitats of the lake, that way you have a better chance of getting a wider variety of algae in your sample. Another skill that I learned in the field was the

importance of rinsing our waders between our lake sampling sites. This is important so that we don't bring contaminants and species with us and spread them to the following lakes. I also got more practice using a YSI device. This is a tool that collects many different water quality parameters, such as temperature, pH, and conductivity. I had a little bit of experience using one of these devices when I took Water Quality at WWU, but I now feel much more comfortable using one of these devices out in the field, and the best ways to keep it safe, as they are very fragile.

My other main learning objective for the internship was to gain more experience doing lab work with water samples. This is an area where I feel I have learned the most skills and gotten a lot of practice doing the specific procedures for the analyses. Firstly, I had to learn how to calibrate the YSI meter so that we could take it into the field with us. Every single time that we go into the field the YSI has to be calibrated again for pH, conductivity, and dissolved oxygen. I was also taught that a common practice that is used for all procedures is the process of lots of rinsing. The rinses of your equipment, such as graduated cylinders, with deionized water and your sample water is a necessary step to do between the different samples in order to not contaminate the next sample and lead to inaccurate results. I learned that there are some procedures that have to be done that same day of collection, while others can be done the next day. One of the steps that must be done the same day after returning to the lab are to clean the algae nets. Another procedure that we had to do the same day of collection was to add magnesium carbonate to our chlorophyll water samples to prepare them for filtering the next day. We also had to filter our Total Dissolved Oxygen (TOC) water samples with a little syringe and a small filter attached to the end, we then added some hydrochloric acid to these samples. We also took some of our water and added an oxidizing solution to the sample and covered the test tubes with foil. These test tubes were then put into an autoclave so that we could analyze the total phosphorus and total nitrogen of the water.

Filtering for nutrients was the last main thing that we had to do same day. We used a larger filtering setup when compared to the TOC, and the filtered water was put into two separate tubes, one for NO_3 , and the other for NH_4 . One very important thing that we did in the lab was to make sure that we had quality control (QC) checks for our work. We did this by doing separate QC checks on nutrients, TOC, alkalinity and turbidity. We would also collect a field dupe every other week in order to have a way of seeing if everything was working the way it should.

Alkalinity is a procedure that we were able to do the day after collecting the samples. This is one of the longest tasks that we had to do. The method that we used to find the alkalinity values was to use pH changes. The first thing that needs to be done when doing alkalinity is to calibrate the probe for pH. Then we do two checks for alkalinity, and they are always the same checks, so that we know that everything is working smoothly. Then we can get started with our samples. We add acid very slowly to the sample and keep adding acid until we reach a specific pH value, and then record how much acid was used. This takes a long time because you have to add the acid very slowly so that you don't add too much acid and overshoot your goal. Turbidity is another procedure that I got experience with at this internship. It is a relatively simple method and all that needs to be done is to do your calibration checks first with the Turbidimeter, and then you put some of your sample in a specific vial that fits in the machine, wiping off the outside first to make sure that you aren't compromising the results. And then the machine gives you the value after a few seconds.

The whole process for chlorophyll analysis was one of the most complicated things that I learned while working for the IWS. There are three main steps to the process: filtering, grinding, and reading. One of the most important things that I learned about chlorophyll is that you have to work with the lights off for all of these steps because the light can react with the chlorophyll and

throw off your results. The filtering we would do the day after sample collection. For the filtering step you run the sample through a small filter with the help of suction, and the filter is what is saved, and stored in the freezer. Below is a picture of the setup for chlorophyll filtering.



One part of my job that gave me a better understanding of the quality of the lakes was when I did data entry. I would compile all of the results of our analyses into one spreadsheet, and some of these results would have to be put through equations so that they were in the form that we needed.

I really enjoyed my time working for the Institute for Watershed Studies. I was able to learn so much, and I feel like my skills have really improved. Having taken Water Quality and Watershed Biogeochemistry helped me feel more confident in my abilities, and more familiar

with some of the procedures that I had to do. I would definitely recommend doing an internship to any that can, and I would highly recommend IWS as a place to work.